## TECHNOLOGY DEVELOPMENT DATA SHEET



# Development of a Long-Term, Post-Closure Radiation Monitor



Developer: Babcock & Wilcox, Inc.

Contract Number: DE-AC21-92MC29103

**Crosscutting Area: CMST** 



#### Problem:

Monitoring of radionuclides at DOE waste sites is necessary to determine if there may be potential impacts to human health or the environment based on the characteristics and movement of the radionuclides present. Monitoring will likely continue long after site cleanup has been completed. This post-closure monitoring of radionuclides will require that large numbers of sensors be installed below ground surface and monitored for long time periods (30 years is typical). Existing monitoring systems are too complex and expensive to maintain in place for long time periods.

#### **Solution:**

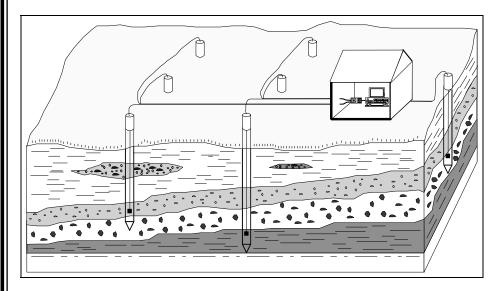
Configure commercially available components into a reliable, lowcost, multi-point system for longterm, post-closure monitoring. This system is based on gamma detection and is planned to be capable of monitoring to depths of more than fifty meters below ground level without having to drill wells. Scintillator probes are installed at each measurement location and are multiplexed to a single aboveground electronics unit. individual scintillators will be located inside hollow tubes installed vertically or horizontally in the vadose zone at a waste site, using cone penetrometer technology.

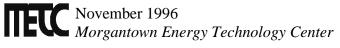
## **Benefits:**

- ▶ Provide in situ long-term and realtime measurement techniques for monitoring contaminant leakage.
- ► Each scintillator is relatively small and can be produced at low cost.
- Scintillator is passive and operates at ambient temperatures; downhole components have demonstrated reliability.
- Long lived with components readily accessible for any required maintenance without soil disturbance.
- All system components are commercial or near-commercial.

# **Technology:**

This radiation monitoring system is based on gamma detection and is designed to be capable monitoring large numbers permanently installed probes. Major components the system of incorporate commercially available scintillation, detectors, and signal processing electronics. Scintillation probes are installed to depths necessary to adequately monitor a







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given site. These probes may be installed in existing boreholes or wells, through the use of cone penetrometer technology, or if necessary, by using standard drilling methods. These probes will be connected to above-ground electronic components and multiplexed to a single data concentrator using RF links. The use of RF multiplexing with the specific electronic components identified for this system allows monitoring of a large number of probes. The above-ground location most of the electronic of components and the absence of below-ground components that require maintenance will minimize long-term costs.

**Contacts:** 

Babcock & Wilcox, through its Research and Development Division, is engaged in product improvement and innovative product development. For information on this project, the contractor contact is:

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DOE's Morgantown Energy Technology Center supports the Environmental Management - Office of Science and Technology by contracting the research and development of new technologies for waste site characterization and cleanup. For information regarding this project, the DOE contact is:

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